QK
.69P



THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

VOL. XVII December 15, 1933. Number 15

LIBRARY
RECEIVED
DEC 22 1933
U. S. Department of Agriculture

# PATHOLOGICAL EFFECTS OF THE EAST WIND IN FLORIDA

F. L. Wellman, Bureau of Plant Industry

Often the agricultural research student encounters, as he becomes familiar with a given locality and its residents, interesting or curious folk tales regarding moon, sunspots, winds, bird migrations, and other apparently unrelated phenomena as factors affecting crops. Many times it appears that coincidence plays a part in the reasons leading up to these folk sayings. But occasionally it may be that such a saying has more than ordinary recurrent observational evidence in its favor, in which case it becomes worthy of study.

A persistent folk saying which the writer heard first in the Celery Delta area of Seminole County, and later in several other vegetable growing districts of the Florida Peninsula, is that "The East Wind poisons crops." Old members of the colored population who work in the fields make this statement. On the other hand, intelligent vegetable growers and students of their problems, whose education is better than the average, insist on its truth. It was for these reasons that some attention was given for the last four seasons to the truth of the saying in the Celery Delta area, the results of which seem worth recording.

## SOME CHARACTERISTICS OF THE WINDS OF THE CELERY DELTA REGION.

Before discussing observations on the "poisonous effects of the "East Wind" it is necessary to state briefly the geographic and meterologic factors affecting the East Wind as it strikes the Seminole County winter vegetable-growing district. The so-called Celery Delta area is approximately thirty miles from the Atlantic seaboard on the east and eighty miles from the coast of the Gulf of Mexico on the west. There is an irregular interchange of winds over the Celery Delta. With oncoming severe cold weather reported in the northern United States winds from the north and northwest frequently sweep down over the Penninsula and it is during these periods that temperatures drop to near freezing and occasional frosts occur. West winds of considerable duration often occur, sometimes lasting for several days. These are more temperate than

those more distinctly north, apparently because they come over some 200 miles of the northern portion of the Gulf of Mexico. These waters are, however, cooled by their close proximity to the continent and consequently the winds which pass over them are likewise affected. Under such conditions temperatures rarely approach frost.

East winds, are, however, almost invariably warm winds. They originate in localities far distant from the Florida shore, possibly out in the Atlantic and come across hundreds of miles of warming water. Before they reach Florida they encounter the warm Gulf Stream, which has its origin in tropical regions and is probably an important factor in producing the warm winter weather of Florida. When, at certain times, temperatures have been hovering about 40, 50 and 60 degrees with winds from the north and northwest, an east wind springs up the thermometer soon registers 20 to 30 degrees warmer. The change is most striking. These east winds may continue with slight changes for days at a time. It is when the season settles down to having east and west winds that an insular type of climate occurs, with little or no rainfall, no days without sunshine, and with the few small cumulus clouds irregularly scattered in the sky and never occurring in solid banks. The southerly winds are strikingly like the east winds in effect, but are not so frequent or prolonged.

DESTRUCTIVE EFFECTS OF THE EAST WINDS.

ON CUCURBITS: In November of 1930 a grower near Sanford called upon the writer for an opinion as to horticultural and pathological matters affecting the production of cucumbers and squash. During the course of the discussion the grower stated that he could grow cucumbers best in one field which was sheltered from the east and south winds, and he was anxious to know the reason. This was the first encounter with the statement that "The East Wind is Poisonous." Frosts killed cucurbit crops that winter and no further observations could be made. In the next two seasons this was kept in mind, and it does appear that this wind has an injurious effect on cucurbits. Extra warmth during the day is followed by heavy dew during cool nights and as a consequence "rust" or mildew (Pseudoperonospora cubensis) and occasionally anthracnose (Colletotrichum lagenarium) attack the vines. A peculiarity of epidemic mildew on cucumbers in the Celery Delta is that it spreads more rapidly and severely where east winds have direct play on the crop.

In the winters of 1931-32 and 1932-33 mosaic was found spreading in squash of cocozelle, summer crookneck and patty pan varieties. The fields most seriously affected were in all cases on the west side of weed patches. The mosaic affecting these plantings was found to be caused by the virus which produces celery mosaic (celery virus 1). It is spread from weed hosts by the melon aphid (Aphis gossypii). Warm days are stimulating to the aphid vector and it appears to travel with the wind, providing it is warm.

ON PEPPERS: From time to time growers have called on the writer to discuss with him "a pepper rust caused by the East Wind." Four fields last spring (1933) and three the year before were examined for this trouble and the causal organism was found to be Cercospora capsici. It was especially notable, last year. that Cercospora spots were very serious in fields where warm east and south winds had full play.

During the late winter and early spring of 1933 one farmer's experience with peppers was watched with considerable interest. In extensive seed beds covering something over two acres, with mosaic-diseased weeds on both east and west sides, it was found that mosaic (celery virus 1) caused severe losses on the east beds. Within 10 feet of the east edge about 80 per cent of the seedlings were diseased with mosaic. The amount was reduced to less than 40 per cent at 20 feet. At 50 feet only a very few diseased plants could be found. On the other hand, on the west side, which was bordered with exactly the same kinds of weeds as severely diseased with mosaic as those on the east side, very little mosaic occurred in the adjacent pepper seedlings. Within the first 10 feet next to the west side only about 6 per cent of the seedlings were affected. In the next 10 feet only a few scattered seedlings could be found which showed infection. The grower said that he had experienced the same type of trouble four years previously with peppers in the same seed beds, and that while he recognized now that the cause was insect-borne mosaic he had previously believed it due to "the poisonous effects of the East Wind."

ON GREEN BEANS: Since the Celery Delta became important as a winter vegetable-growing district, green beans have been produced in small amounts for early November and Thanksgiving Day trade in the North. During late years the acreage in green beans has increased and this year it approximated 2000 acres and beans will be shipped north until the latter part of December unless frosts kill the vines.

Repeated requests were made of the writer this fall (September and October 1933) to visit bean fields to diagnose various troubles and suggest remedies. Diseased plants were brought in and in some cases the writer visited the affected field. A burnt appearance of the leaves, which in some cases looked like bacterial spot, was found in practically every field, being more severe in certain portions of the field than in others. The diseased areas were curiously prevalent in sections of fields and in plants most fully exposed to east and south winds.

A more thorough examination of symptoms and check up of seed sources was made. Microscopic examination disclosed no bacteria, other than a few cases of advanced secondary invasion of the lesions. The necrotic areas were found to be most severe on exposed leaves. Where necrosis had not proceeded too far, healing occurred to a certain extent. Careful observation during both warm and cool weather throughout the fall showed that the burning increased on warm days. During cloudy comparatively windless days there was apparently no burning. The seed came originally from western seedsmen who supposedly handle bacterial blight-free seed. This trouble was therefore diagnosed as wind and sun burn of beans. It is notable that the cool north and west winds did not cause increased amounts of the burn, and that the growers recognized that fact blaming the trouble on "the poisonous effects of the East Wind."

ON GARDEN PEAS: Although garden pea (also called English Pea by local growers) is not a major crop in the Celery Delta, as much as 200 acres have been grown in a single season. In January 1932, the writer watched with considerable interest the development of bacterial blight

(Bacterium pisi) in two fields of peas. Three other patches of less extent close by remained relatively free from the trouble. The farmers who had the bacterial blight blamed it on the east wind which during that spring was exceedingly constant and warm resulting in heavy dews. The three farmers who did not have severe bacterial disease in their peas claimed it was due to the fact that they missed the severe effects of the east wind. Observation showed that all five pea patches were equally open to east winds. The heavy dews coupled with large amounts of infection on the seed served to cause a severe epidemic of disease in two fields, while in the patches grown from comparatively disease-free seed little bacterial trouble resulted. Without bacterial infec-fection the east and south winds had no effect on garden peas.

ON EARLY CELERY: In popular parlance the winter celery grown in the Celery Delta is divided into the early and the late crop. Early celery is harvested and shipped beginning about Christmas time until March and April. Late celery is ordinarily shipped during April, May, and June. Seasonal and market conditions cause fluctuations in the time of harvest but it is fairly constant.

Celery seedlings are notoricusly slow in growth, and plants may remain in seed beds for six to twelve weeks. It is no wonder that seedling diseases are of importance to the celery grower. An important damping off disease occurs in the early-planted seed beds, and it seems to have been more serious last year than ever before. Growers have conflicting opinions as to its cause, but (perhaps by coincidence) a large number suggested that the east winds caused them all trouble. It is true that the hurricane season was unusually severe this year, but aside from actual loss due to blowing away of seedlings and seed beds by intense easterly gales, the later gentle east winds coupled with warm days and cool nights occurred at the same time that a progressive damping-off in the seed beds was noted. Some farmers lost more than 50 per cent of their seedlings from damping-off, although 10 per cent was the more common figure. The cause of damping-off has not yet been determined (this is being studied at the present time) but its connection with east wind effects is apparent.

After transplanting, the first disease which attacks early celery is blight caused by Cercospora apii. That "the blight disease spreads in the direction of the East Wind" is a common saying among the older growers who produced celery in the days before the intensive use of Bordeaux mixture. Since, during periods of prolonged east winds, the days are almost certain to be bright and warm followed by heavy dew at night, the intensification of Cercospora infection is not at all unlikely.

In places to the west of beds of mosaic-infected weeds, mosaic (celery virus 1) develops in the celery. The mosaic, moreover, spreads westward more rapidly than either eastward or southward. It is the observance of such phenomena that have caused many excellent farmers to hold that "the East Wind is poisonous for celery." Circumstantial evidence certainly leads to such a conclusion. Observations are still being made in this connection. It appears that winged aphids leave diseased weeds often during warm sunny days when a gentle wind is blowing. Since this is most common during the periods of an east wind, and since the aphid has a weak flight and is easily carried by winds, it is easy to understand how this spreading of mosaic can occur most vigorously on the lee of east winds.

ON LATE CELERY: The situation with late celery is likely to be different from that of early celery. The season is warmer, dews are heavier, aphids are more numerous, and the late-planted fields are almost certain to be surrounded with early celery which is harvested before the late celery is matured.

When celery is harvested the plants are cut from the ground and the outer leaves that are spotted and otherwise imperfect are stripped off and left in the field. Unsalable stalks of celery are also left in the field. This debris is not usually plowed under for a week or so. As a result, fungus spores have a chance to be detached in the winds and deposited on the later growing celery plants. Aphids leave wilting plants, and, if they are winged, fly up into the breezes which carry them over into greener pastures. It is hardly to be wondered at that the farmer finds it more difficult to control diseases on late celery than on early celery. And here, again, it is notable that the east winds are the most advantageous for the carrying of disease, whether by fungus spores or by viruliferous insects.

CONCLUSIONS.

The phenomena discussed above are all connected with occurrence of the easterly winds. An interesting point is the variable factors which produce the effects mentioned. In the case of the aerial fungous parasites, warmth, effects of weather on stomatal openings, dew, etc. are all significant. In the case of damping-off too little is known to be certain what the important factors are, however, it is of interest that dew is not necessary for its development. In the case of physiological disturbances resulting in "burn" the east-wind effect appears to be due to excessive drying following rapid development of succulent growth. In bacterial infections it seems that dew is again important. However, it must not be forgotten that stomatal activities are also important in bacterial diseases, as may be insect visitors. In the case of the mosaic troubles, the relationship between effects on vector, virus, and plant are complex. Warmth stimulates aphid activity, bright days combined with gentle winds insure flight of the insects, and cool nights aid in the development of the celery plant so that the mosaic may develop in its most rigorous fashion. Sanford, Florida, December 1, 1933.

## DISEASES OF CANNING CROPS IN MARYLAND IN 1933

SNAP BEANS: Anthracnose (Colletotrichum lindemuthianum) caused very little damage to the bean crop this year. The disease was observed in a few fields where infected seed had been used or where the crop was planted on land that had produced an anthracnose-infected crop within the last two years. The general use of western-grown seed for the canning acreage has practically eliminated losses from this disease.

Bacterial blights (Bacterium phaseoli, etc.) were widespread and caused considerable losses through leaf injuries. The losses from pod infections and stem girdling were much less than last year. As usual, the Full Measure was more seriously affected than the other common canning varieties. A relatively new introduction, the Konserva, was much more seriously injured than Full Measure, both in 1932 and 1933. Its susceptibility will probably preclude its use in Maryland.

Mosaic (virus) was generally distributed but was less serious than last year and caused only a trace of loss. The Refugee is grown to a very limited extent in Maryland, and the symptoms on the other varieties usually become masked by mid-season.

Root rots (Fusarium and Rhizoctonia) are generally distributed in Maryland but are most serious in the intensive bean-producing areas. The losses this year were normal.

LIMA BEANS: Bacterial spot (Bacterium vignae) occurred in most fields of lima beans but was of little importance. Root rots (Fusarium and Rhizoctonia) were present in all fields, producing normal reductions in yield. Pod blight (Diaporthe phaseolorum) was observed in only a few fields. In one field of Fordhooks grown for canning, the disease was causing a heavy loss.

SWEET CORN: Root, stalk and ear rots (various organisms) were prevalent throughout the State, as usual, causing the normally high losses.

Smut (Ustilago zeae) was more severe this year than usual, the early crop suffering the greatest losses.

Bacterial wilt (Aplanobacter stewarti) was more widely distributed and destructive in the canning acreage than in recent years. The canning varieties commonly used in Maryland are late maturing and generally escape the disease. This year, however, all varieties observed were affected to a slight extent. In plots at the Maryland Experiment Station some of the early-maturing varieties were almost complete losses. The average damage for the State is less than one per cent.

PEAS: Root rot (Aphanomyces euteiches) was general and destructive, although it did not cause as great losses as last year. Growing conditions were more favorable for peas this year than for several seasons and the plants were able to produce in spite of infection.

Wilt (Fusarium orthoceras var. pisi) caused heavy losses in certain fields. The value of wilt-resistant strains for infected land was demonstrated in tests for the third consecutive year. Over thirty test plantings in the central part of the Eastern Shore failed to reveal the presence of the disease in that section.

Bacterial blight (Bacterium pisi) occurred in numerous fields, and early in the season, threatened to kill the plants. The disease did not progress later in the season and the peas made an apparently normal growth after the temporary set-back.

Blight, pod spot, and foot rot (Ascochyta spp. and Mycosphaerella pinodes) were observed in numerous fields but were causing very little damage.

TOMATOES: Wilt (Fusarium lycopersici) was not as general or as serious as last year. The rather general use of the Marglobe and other wilt-resistant varieties throughout the wilt-infested areas has greatly reduced the annual losses. In 1932, however, the disease was severe, causing appreciable losses even in the wilt-resistant varieties.

Early blight (Alternaria solani) was somewhat more prevalent early in the season than it was the previous year. During the storms of August 21 to 24, in which the rainfall was about 8 inches, tomato plants were simply drowned out and defoliation occurred almost immediately. Leaf diseases spread rapidly during this period, but it was difficult to distinguish between direct storm injury and that due to the secondary spread of leaf diseases.

Leaf spot (Septoria lycopersici) was not as prevalent early in the season as it had been the year before. Defoliation, following the storms, occurred before Septoria usually becomes serious.

Mosaic (virus) was prevalent, as usual, but the plants were killed by the storms before part of the secondary spread had occurred.

Bacterial spot (Bacterium vesicatorium) was not as general as last year, but caused heavy losses in some few fields. The plants for these fields were reported to have been badly affected with the disease in the seed bed in Georgia.

Bacterial canker (Aplanobacter michiganense) occurred to a limited extent in the sections using southern plants. In all cases observed, with the exception of a few individual plants, the disease occurred only in fields where the southern plants were used. No very heavy losses were reported, although the disease was present in a good many fields.

Collar rot (various organisms) was prevalent and destructive. Many fields were almost a total loss. The greatest damage resulted from plant beds that had been located on the same ground for several years.

Anthracnose (Colletotrichum phomoides) occurred on a higher percentage of the fruit this season than for years past. This was due, no doubt, to the early defoliation of the plants following the storms, leaving the fruit in a weakened condition and exposed to the sun.

Sun-scald (non-parasitic) was general, following the August storms. Only a small percentage of the fruit colored properly, although there was less actual "scalding" than last year, due to the cool, cloudy weather following defoliation.

Blossom-end rot (non-parasitic) caused very little damage. Buckeye rot (Phytophthora terrestris) occurred in most fields but caused only a trace of damage. Damping-off (various fungi) was not observed except in poorly-ventilated hotbeds.

The various fruit rots caused more loss this season than all other diseases combined. Following the storms, at least 25 per cent of the fruit rotted and was left in the field. (H. A. Hunter, Extension Pathologist, Canning Crops, University of Maryland Extension Service. November 24).

## DISEASES OF CEREALS IN OREGON AND WASHINGTON IN 1933

The following reports are contributed by Roderick Sprague (Nov. 28):

FOOTROTS.

Cercosporella herpotrichoides. Since large areas of winter wheat were frozen out during the December freeze of 1932 the total loss from Cercosporella herpotrichoides was less than average but in the Grande Ronde Valley, Oregon and near Spokane, Washington, the footrot was prevalent, the loss approaching that of the season of 1928, the worst on record. Bromus tectorum, Agropyron inerme, A. riparium, and Koeleria cristata were also attacked by the fungus near Liberty Lake Junction, Washington.

Helminthosporium sativum. The Helminthosporium footrot or internal crown necrosis of dry land winter wheat was present as usual in the few portions of the Columbia Basin where winter wheat survived the December freeze.

Ophiobolus graminis. The disease Take-all which is usually severe in the western portions of Oregon and Washington was absent as the winter wheat crop was frozen out almost 100 per cent, a very rare occurrence for the western half of these States.

Gibbellina cerealis Pass. This disease which is apparently unreported outside of Italy and adjacent countries has been under observation in the coastal strip of Oregon for several years. During most seasons it causes a small amount of loss in winter oats and considerable in winter wheat. Fortunately the latter crop is very little grown in the acid soils of the coastal strip and the disease will probably not become destructive. In non-rotated experimental plots the disease has been steadily increasing on all hosts including traces in early seeded spring wheat. The disease is apparently held in check by rotation in Lincoln and Lane Counties, Oregon.

Helminthosporium avenae. This fungus causes a leaf spot of winter oats and a footrot of both winter and spring oats in the coastal portions of Oregon. The losses from this obscure disease are probably underestimated.

Fusarium(?) culmorum. During August 1933 the spring oats fields along the coast of Oregon south of Astoria showed at least 15 per cent loss from a stunting due presumably to a species of Fusarium. The diseased grain averaged about one-third as tall as the healthy, the stunted areas sometimes covering over a third of the total area in the fields.

Footrot of corn. In the cold sour soils along the coast of Oregon field corn is sometimes stunted in early season by a hard rot of the subcoronal internode. A fungus which is consistently isolated may prove to be a species of Fusarium.

LEAF SPOT DISEASEASES OF CEREALS AND GRASSES IN OREGON.

Scolecotrichum graminis was present on many species of grasses this season, being especially severe on timothy and on tall oats grass (Arrhenatherum elatius). The severe freeze of December 1932 and of February 1933 killed many of the grasses in the Willamette Valley and predisposed the survivors to attacks of this fungus during the humid months of March and April.

Septoria spp. Septoria tritici was moderately destructive to wheat this season, especially near Corvallis. Septoria spp. were found on the following hosts, Poa pratensis (Septoria sp. and S. (?) nodorum), Poa sandbergii (new host), Poa compressa, Poa (?) confinis (new host), Agrostis maritimus (new host), Bromus hordeaceus, B. marginatus, B. commutatus, Holcus lanatus, and Sitanion hystrix (new host). The leaf spots on Poa pratensis and on the brome grasses were common and of some economic importance.

## SOME DISEASES OF NUT TREES IN OREGON

JUGLANS REGIA (Persian Walnut). Pleurotus pulmonarius var. juglandis Sacc. was found fruiting on one tree only in a seedling orchard near Amity. The fungus is probably a weak facultative wound parasite, developing only in the event that the host is weakened by drouth, undernourishment, or some other adverse condition. Schizophyllum commune Fr. was also noted in an orchard near Amity. It is apparently a saprophyte or a very weak parasite.

CASTANEA DENTATA (American chestnut). Trees in a planting near Eugene found dying from an undetermined cause, thought to be drouth, undernourishment, or other adverse conditions favoring winter injury. No fungus was found associated with the death of the trees. Schizophyllum commune was found fruiting in dead bark near Eugene. Observational evidence indicates that the fungus is a saprophyte, or only very weakly parasitic on bark already dead from other causes. (P. W. Miller, Nov. 28).

## STRAWBERRY LEAF VARIEGATION

In a recent letter from Dr. Paul H. Miller, Chief Inspector of the Arkansas Plant Board, he states that the "suspected mosaic" of strawberries has now been found on another variety known as Bitter Root, in addition to the Blakemore variety. I believe that all strawberry plantings which are to be used for production of plants for sale have now been inspected so it seems reasonably certain that this trouble is not present on other varieties. (V. H. Young, Dec. 4).